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## SAFETY DEVICE FOR A LADDER

Technical Field

This invention relates to a safety device for a ladder and in particular a safety device in the form of a support bracket attached to a ladder for temporary securement to the 5 roof of a house to prevent the ladder from being dislodged when the ladder is being used against the house.

Background Art

Although the following description refers to ladders generally, no limitation is intended thereby. Any related device including, but not necessarily limited to, step 10 ladders, fixed length ladders, extension ladders, trestles, work platforms or scaffolding, requiring a ladder like element to be placed against a building, is also contemplated. Again, although the following description refers primarily to conventional houses or buildings having a gutter mounted on a conventional fascia, no such limitation is intended, and any analogous use of a ladder whether against a 15 gutter or otherwise is meant to be included, whereby suitable adaptation, the invention may be so employed.

Of necessity, ladders are used on a variety of surfaces and in many instances the ground or surface on which they are used is uneven, sloped or stepped. This in itself makes the ladder prone to movement when a person stands on any of the higher 20 rungs of the ladder, especially if the ground is soft or otherwise less stable than expected. Although some surfaces against which a ladder can be placed or leant do provide a degree of frictional contact to prevent sideways slippage, eg rough brick work or render, contact of a ladder against a gutter is especially problematic, as the ladder to gutter contact is often a relatively slippery one, being inherently metal to 25 metal (or metal to plastics in some cases).

It should be noted that whilst it might be preferable to avoid leaning the ladder against a gutter at all, this is usually the only suitable way of gaining access to the roof above, if the person using the ladder requires to have such access. In other words using a ladder against a gutter in many instances simply cannot be avoided.

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However, it would also be useful if the ladder did not in fact contact the gutter at all, especially if the gutter is made of plastics or formed from aluminium, as the gutter may be damaged.

In any event, even when used on stable level ground there is still an inherent risk of 5 the ladder, especially when used over longer reaches, sliding sideways when it is leant against a gutter, especially in situations where there might be sudden weight transference or over-reaching by the person concerned. Even the very mode of gaining access to the roof area means the ladder may be moved sideways as the user takes his weight off the ladder and steps onto the roof, or much more dangerously 10 steps from the roof onto the ladder, which might unexpectedly move away.

It would therefore be extremely advantageous to provide a simple temporary means of providing a safe way to prevent the ladder from moving sideways along the gutter or otherwise moving sideways in such situations, which is itself relatively easy to use and economical. It would also be advantageous if such means also meant that the 15 ladder itself was not actually resting on the gutter.

#### Object of the Invention

The present invention has therefore been conceived out of the need to provide a relatively inexpensive temporary but safe bracket arrangement for use in the vicinity of a gutter or edge of the roof, whereby a ladder or similar device can be restrained 20 from sideways movement, preferably whilst keeping the ladder from actually contacting the gutter. In other words, a support bracket designed to allow a ladder to be safely used to gain access to a roof of a building or the like (or otherwise supported as if it were leant against the gutter), preventing it from moving either sideways and/or downwardly, is thus contemplated. At the very least, the invention 25 provides an alternative to presently known methods of restraining the movement of ladders when used against buildings and/or reducing damage caused from ladders placed against gutters.

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Disclosure of the Invention

According to the present invention there is provided a bracket arrangement for removable attachment to the upper regions of a ladder, the bracket having a pair of laterally spaced apart arms for adjustably rotatable attachment to respective sides of

5 the ladder, the arms extending generally away from the ladder towards a roof of a building when the ladder is used against the side of said building to gain access to the roof, the angle between the arms and the plane of the ladder being adjustable to suit varying conditions of use, the bracket having a pair of braces, each attached to respective sides of the ladder and adjustably rotatable about the point at which each

10 is attached and extending from the ladder on respective sides thereof for locking each respective arm of the bracket so as to maintain each arm in predetermined angular relationship with respect to the plane of the ladder, the bracket having a cross member extending at least between the free ends or free end regions of each arm for placement against the roof of the building.

15 The end or end region of each brace remote from the ladder, is preferably connected to the corresponding free end region of each respective arm, or may be located elsewhere along the length of the arm, being preferably connected thereto in adjustably rotatable fashion. It will also be understood that not only the angle itself may be adjusted by the angular relationship of each component, but also the overall

20 geometry may be determined by having one or more points for affixing each component to the other, along either any or all of the stile of the ladder, the arm, or the brace, to allow for adjustment as required.

Preferably the cross member has a replaceable anti-slip cover to provide means to reduce the likelihood of the bracket (and hence the ladder itself) moving sideways

25 during use, and to protect the roof sheeting at the point of contact.

With advantage, the cross member may be provided with means to allow it to be temporarily affixed to the roof by having for example a series of holes or slots therethrough, to allow a screw etc to be located therethrough for temporarily affixing

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the cross member to the roof. Alternatively, and with advantage, a further plate may be provided extending at right angles to the said cross member which will give greater flexibility in finding suitable positions for attachment. This follows when one considers that most metal roofs for example are affixed in such a way that the

5 fixing screws form rows across the roof (ie in the general direction of the cross member, being affixed to battens) and a plate extending perpendicular thereto, in this case perpendicular to the cross member which will be generally parallel with such rows of screws, will give greater flexibility in simply allowing one screw to be removed from the roof and replaced through the plate for re-fixing into the batten of

10 the roof, thereby securing the plate and hence the bracket and ladder from sideways movement.

The pair of arms and the pair of braces associated therewith may be affixed to the ladder in one of several ways. For example in one embodiment, they may be affixed with removable pins inserted through holes in the ends of the arms and braces where

15 they are to be attached to the ladder, the pins passing through corresponding holes in the stiles forming the sides of the ladder. The pins may be secured in one of several ways, being themselves split pins, or affixed with cir-clips or the like.

Alternatively, the arms and braces may be affixed to the ladder by means of clamps affixed either around the styles, or around the rungs, at least at the outer reaches

20 thereof to avoid difficulty in otherwise using the rungs of the ladder.

With advantage, a preferred embodiment for use with ladders having hollow rungs, provides for a rod or hollow tube which extends between the respective ends or end regions of the arms and braces where they to be attached to the ladder, and which is caused to pass through one of the hollow rungs. One such rod or tube will pass

25 through one rung for connection to respective ends of the arms, whilst another will pass through another rung, (generally an adjacent rung,) for connection to respective ends of the braces.

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This is achieved by having any suitable means for removably securing the end regions of the rods or hollow tubes to the respective arms or braces as the case may be. For example, the ends of the rods or tubes may be threaded, either externally or internally to accommodate a nut in the former case, or a screw in the latter for 5 joining the rod or tube with the respective arms and braces.

One especially useful means of removably interconnecting the rod or tube with the arms or braces is provided by means of an expanding bolt or screw arrangement, where for example tightening a bolt or screw causes material such as rubber or elastic material around the screw or bolt which is located in a hollow end of the rod 10 or tube, to expand and engage in locking arrangement with the interior of the hollow portion.

Advantages follow from this particular arrangement in that it is not necessary to provide threaded rods or tubes having different lengths, as all that is required is to provide rods or tubes of sufficient length to be used in the widest ladders, the user 15 simply cutting the rod or tube to the appropriate length for use with his own ladder.

Thus in one simple preferred embodiment, the two arms and the braces may all be identical, whilst the material for the cross member as well as the two rods or tubes required to connect each respective pair of arms and braces through the rungs of the ladder, may be cut from a common length of material according to the size of ladder 20 to which the bracket is to be fitted, thereby greatly reducing the cost of manufacture etc..

Preferably, bracing, for example in the form of a pair of cross braces is utilised to brace the arms when they extend from the ladder in generally parallel arrangement. Alternatively, and with advantage, the arms themselves may be so shaped, that they 25 extend not in parallel arrangement from the ladder, but for example, diverge, so as to provide inherent bracing by such geometric arrangement.

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Brief Description of the Drawings

The invention may be better understood from the following non-limiting description of one or more preferred embodiments, in which:

- 5 Figure 1 is a side elevation of a ladder and bracket combination according to one aspect of the invention;
- Figure 2 is a plan view of one embodiment of the invention in which the arms and braces of the bracket are in generally parallel arrangement and are secured to the ladder by means of a tube passing through respective rungs of the ladder;
- Figure 3 is a side elevation of the embodiment of Figure 2;
- 10 Figure 4 is a plan view of a second embodiment of the invention in which the arms and braces of the bracket are in generally parallel arrangement and are secured to the ladder by means of clamps about the styles of the ladder;
- Figure 5 is a side elevation of the embodiment of Figure 4;
- 15 Figure 6 is a plan view of one embodiment of the invention in which the arms and braces of the bracket are in generally parallel arrangement and are secured to the ladder by means of clamps located on respective rungs of the ladder;
- Figure 7 is a side elevation of the embodiment of Figure 6;
- 20 Figure 8 is a plan view of a further embodiment of the invention in which the arms and braces of the bracket are divergent arrangement to provide inherent self bracing are secured to the ladder by means of a tube passing through respective rungs of the ladder;
- Figure 9 is a side elevation of the embodiment of Figure 8;
- 25 Figure 10 is a plan view of a second embodiment of the invention in which the arms and braces of the bracket are divergent arrangement to provide inherent self bracing are secured to the ladder by means of clamps about the styles of the ladder;
- Figure 11 is a side elevation of the embodiment of Figure 10;

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Figure 12 is a plan view of one embodiment of the invention in which the arms and braces of the bracket are divergent arrangement to provide inherent self bracing are secured to the ladder by means of clamps located on respective rungs of the ladder; and

- 5 Figure 13 is a side elevation of the embodiment of Figure 12;

#### Detailed Description of the Drawings

Referring generally to the figures, where like components of the various embodiments are numbered in like manner, there is a safety bracket generally referenced 11 for a ladder 12, the purpose of which is to prevent the ladder 12 from 10 making contact with the edge region 13 of a roof 14 mounted above a wall 15 of a structure such a building, shown schematically in Figure 1. The edge region 13 may be a gutter, fascia etc not specifically illustrated. The bracket 11 is located so as to also prevent, or at least assist in preventing, sideways movement of the ladder 12, thereby increasing the inherent safety for someone who might use the ladder 12.

- 15 The ladder 12 has styles 16 supporting rungs 17 in known fashion.

The bracket 11 comprises a pair of arms 18, which in the embodiments of Figures 2 to 7 extend in parallel arrangement from the ladder 12, whilst in Figures 8 to 13 are in divergent arrangement. A cross member 19 extends between the free end regions 20 of the arms 18 (in the case of Figures 2 to 7 actually extending beyond the end 20 regions 20). A soft cover 31 may be located about the cross member 19 to protect the roof 14 in use. In the various embodiments shown in Figures 8 to 13, the arms 18 will be self bracing by virtue of their divergent relationship, whereas in the former embodiments of Figures 2 to 7, a pair of cross braces 21, 22 are provided.

A brace 23 is provided is provided to keep the respective arm 18 in a locked position 25 as required. In the case of Figures 2 to 7, this brace 23 extends from a position on the ladder 12 to a point 24 along the length of the arm 18, whereas in Figures 8 to

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13, the braces 23 are coterminous with the free ends 20 of the arms 18, at which location the cross member 19 is also joined with the arms 18.

The methods by which the respective arms 18 and braces 23 are affixed to ladder will now be described. In the embodiments of Figures 2-3 and 8-9, the fixing is by

5 means of tubes 25 made to pass through the centres of respective rungs 17, for connection to respective ends of the arms 18 and braces 23, the tubes 25 capable of receiving expandable bolts 26 which are inserted through corresponding holes in the arms 18 and braces 23 so that upon expansion of the bolts 26, the arms 18 and braces 23 are held between the head of the bolts 26 and the tubes 25.

10 In the embodiments of Figures 4-5 and 10-11, the arms 18 and braces 23 are affixed to the styles 16 of the ladder 12 by means of clamps 27 which are tightened onto the styles 16 by bolts 28 in known manner.

On the other hand, in the embodiments of Figures 6 to 7 and 12-13, the arms 18 and braces 23 are affixed to the respective rungs 17 of the ladder 12 by means of clamps 15 29 suitable for that arrangement. Again the clamps 29 may be tightened on the rungs 17 by means of bolts 30.

A plate 32, as shown in Figure 12 may be utilised with any of the other embodiments. The plate 32 is provided with holes 33 for fixing at various locations to the roof 14 by means of screws not shown as described above.

20 It will be understood, that variations in the geometry of these arrangements may be easily made by providing one or more fixing points along any or all of the styles 16 of the ladder 12, the arms 18 or the braces 23 of the bracket 11, as required to give greater flexibility for use of the bracket 11 on ladders 12 of different sizes, or for use in relation to rooves 14 of different pitches etc.

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It will be appreciated by those skilled in the art that many modifications and variations may be made to the embodiments described herein without departing from the spirit or scope of the invention.

Throughout the specification the word "comprise" and its derivatives are intended to have an inclusive rather than exclusive meaning unless the context requires otherwise.